

Serial No.: 10/692,938

Examiner: H. Trinh

Title: SEMICONDUCTOR DEVICE AND METHOD FOR MANUFACTURING THE SAME

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Amendments to the Claims:

This listing of claims will replace all prior versions and listings of claims in the application.

Listing of Claims:

1. (currently amended) A semiconductor device comprising:
 - a semiconductor element including a plurality of electrode parts; and
 - a wiring substrate including:
 - an insulation layer;
 - an electrode-part-connection electrode provided in the insulation layer;and
 - an external electrode that is provided in the insulation layer and that is connected electrically with the electrode-part-connection electrode,
 - the electrode part and the electrode-part-connection electrode being connected electrically with each other; wherein
 - the insulation layer has an elastic modulus of not less than 0.1 GPa and not more than 5 GPa, and
 - a surface of the electrode-part-connection electrode defining a smooth surface with adjacent portions of a surface of the wiring substrate on a semiconductor element side, and the surface of the wiring substrate on the semiconductor element side being recessed at a position where the electrode-part-connection electrode is provided;
 - the electrode part and the electrode-part-connection electrode include metal layers made of at least one kind of metal selected from the group consisting of noble metals and solder alloys, and
 - the metal layer of the electrode part and the metal layer of the electrode-part-connection electrode are connected by a metal joint that is devoid of bumps, and
 - further wherein
 - a surface of the wiring substrate on a semiconductor element side and a surface of the semiconductor element on a wiring substrate side are bonded directly with each other so that spaces between the electrode parts are filled with the insulation layer.

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2. (canceled)

3. (canceled)

4. (previously presented) The semiconductor device according to claim 1, wherein a surface of the wiring substrate on the semiconductor element side extends beyond edges of the surface of the semiconductor element on the wiring substrate side.

5. (original) The semiconductor device according to claim 4, wherein the external electrode is arranged on a surface of the insulation layer that is seen when the semiconductor device is observed in the thickness direction thereof from a semiconductor element side.

6. (original) The semiconductor device according to claim 1, wherein
the wiring substrate further includes an inner via that is provided in
the insulation layer so as to go through the insulation layer in a thickness
direction thereof, and

the electrode-part-connection electrode and the external electrode are
connected electrically through the inner via.

7. (original) The semiconductor device according to claim 6, wherein the wiring substrate further includes at least one wiring layer arranged in the insulation layer.

8. (original) The semiconductor device according to claim 1, wherein the insulation layer is made of a material containing a thermosetting resin.

9. (original) The semiconductor device according to claim 8, wherein the material containing a thermosetting resin contains 75 wt% to 91 wt% of an inorganic filler, and 9 wt% to 25 wt% of a resin composition containing a thermosetting resin.

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10. (original) The semiconductor device according to claim 9, wherein the thermosetting resin contains at least one kind of resin selected from the group consisting of epoxy resins, phenol resins, cyanate resins, and thermosetting polyimide.

11. (original) The semiconductor device according to claim 10, wherein in the case where the material containing the thermosetting resin does not contain thermosetting polyimide, the material containing the thermosetting resin contains a thermosetting resin with a glass transition temperature of not higher than 150°C.

12. (original) The semiconductor device according to claim 1, wherein the semiconductor element has a thickness of not less than 30 μm and not more than 100 μm .

13. (original) The semiconductor device according to claim 1, wherein the insulation layer has a thickness of not less than 30 μm and not more than 200 μm .

14. (original) The semiconductor device according to claim 1, wherein the semiconductor device has a thickness of not less than 60 μm and not more than 300 μm .

15. (canceled)

16. (canceled)

17. (canceled)

18. (canceled)

19. (canceled)

20. (canceled)

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21. (canceled)

22. (canceled)

23. (canceled)

24. (canceled)

25. (canceled)

26. (canceled)

27. (canceled)

28. (canceled)

29. (canceled)

30. (canceled)

31. (canceled)

32. (canceled)

33. (canceled)

34. (canceled)

35. (canceled)